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ABSTRACT

Report cards (RCs) on schools have become common in several states. This study determined relationships among factors reported in RCs developed for local school districts within Tennessee in 1988-89. Every year the state board of education produces an RC for each school district containing student outcome data (test results and achievement data) and other school district data. Research questions are: (1) how do school district characteristics currently reported in the RCs relate to reported student academic achievement; (2) how do reported district characteristics relate to each other; (3) when rank-ordered on the basis of student outcomes, how do districts perform in terms of district and community characteristics reported in the RC; (4) do the reported district characteristics represent all factors that influence student academic achievement; and (5) how can findings of this study inform educational policy decisions? In all, 121 out of Tennessee's 139 school districts were considered. Results show that "good" inputs, such as money, small classes, and "good" community, do not guarantee high student achievement, and that the individual association of any one factor with high achievement is minor. Clearly, factors other than those reported in the RCs are at work in the highest and lowest performing districts. Commonly used and reported measures account for only about 25% of the variance relative to mean student outcome; the other 75% remains unexplained. Five tables and 14 figures present study data. A four-item list of references is included. (SLD)

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ROLE OF SCHOOL DISTRICT REPORT CARDS?

(Why Do We Bet on .25 With .75 Running Loose?)

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ROLE OF SCHOOL DISTRICT REPORT CARDS?
(Why Do We Bet on .25 With a .75 Running Loose?)*

I. INTRODUCTION

Currently, there is great interest across the country in outcomes based education, school accountability based on student performance, and clear communication to school constituencies of the achievements of students in local school districts and individual schools. The development and publication of report cards on schools have become common in a number of states, and that concept is imbedded in the current national education agenda and in the educational agendas of groups such as the National Business Roundtable. However, relatively little attention has been given to the value and uses of "report card" data beyond communication and comparison.

In Tennessee (TN) a report card on schools contains information on student academic achievement (usually average test scores), school and/or district educational expenditures, community per capita income, student enrollments, student attendance, professional personnel, professional salaries, average class sizes and assorted other factors deemed to be important to understanding education in the community and providing appropriate points of comparison with other schools or districts in the state and region. Generally, a reader does not know what relationship the entries have to each other or to student achievement, if that is considered to be the "bottom line." While the inclusions tend to imply to most readers that the factors reported determine, or at least strongly influence, student achievement, that relationship is rarely stated or investigated.

The purpose of this study was to determine the relationships among factors reported on one set of report cards—those developed for local school districts within TN. The analysis should provide information about the relationship of various factors to student outcomes and information about the value of the factors themselves. The former information should be of value to policymakers and educators attempting to determine where and how to allocate resources (money, personnel, etc.). The latter information should be useful to educators and policymakers who are developing or refining report cards.

II. TENNESSEE'S (TN) REPORT CARDS

Each year, Tennessee's State Board of Education produces a report card on each school district using data provided by the school system and the State Department of Education. The report cards report district level data; i.e., individual school data are not reported. In its current format, a school district's report card contains both student outcome data (testing information) and other school district data. Figure 1 and 2 display a typical report card for "Widget" city school district.

As can be seen in Figures 1 and 2, the information is organized under two sections: (1) Testing information, (2) School Information for "Widget" City. The second section is subdivided to include: (1) System Information,

* *Would you bet on this in Las Vegas?* By G. C. Bobbett

Testing Information for Widget City		Grade Level	1987-88	1988-89	State Average
Basic Skills First Achievement Test (percent score)	Reading	3	90	88	80
		6	82	80	77
		8	92	91	81
	Math	3	91	90	82
		6	67	71	66
		8	77	84	66
Stanford Achievement Test (Stanine score) 7-9 = High 4-6 = Average 1-3 = Low	Reading	2	6	7	6
		5	6	6	5
		7	6	6	5
	Math	2	7	8	6
		5	7	6	6
		7	7	7	5
	Spelling	2	6	7	6
	Language	5	6	6	5
		7	6	6	5
	Environment	2	7	7	6
	Science	5	6	7	6
		7	6	6	5
	Listening	2	7	7	5
		5	6	6	5
		7	6	6	5
	Social Science	5	6	6	5
		7	6	6	5
Stanford Test of Academic Skills (TASK 2) 7-9 = High 4-6 = Average 1-3 = Low	Reading	9	6	6	5
		12	6	6	5
	Math	9	6	6	5
		12	6	6	5
	English	9	7	6	5
		12	6	7	5
	Science	9	7	6	5
		12	6	6	5
	Social Science	9	5	6	5
		12	6	5	5
Tennessee Proficiency Test (% Students Passing)	Language	9	88	92	78
	Math	9	95	98	90
	Both	9	86	91	76

Figure 1 Achievement tests found on a typical school district's Report Card.

System Information for Widget City		Grade Level	1986-87	1987-88	1988-89	State Average
Number of Schools		K-12	5	5	5	12
Average Daily Membership		K-12	3,291	3,394	3,372	5,874
% Student Attendance		K-12	95.7	95.3	95.1	93.6
% Enrollment Change		9-12	-13.0	-16.1	-15.2	-24.7
% Oversized Class		K-12	1.2	1.4	2.3	3.8
% of Students on Free or Reduced Price Lunch		K-12	23	21	21	42
Expenditures per pupil		K-12	$2,718	$3,299	$3,501	$3,304
County Per Capita Income		K-12	"	"	$12,819	$12,878
% Elementary Schools Accredited by SACS		K-8		100.0	100.0	29.1
% Secondary Schools Accredited by SACS		7-12	100.0	100.0	100.0	64.9
Professional Educator Information						
% Professionals on Career Ladder Levels II & III		K-12	22.9	21.9	25.6	14.8
Average Professional Salary		K-12	$25,198.60	$26,085.44	$30,804.37	$26,756
Student Information						
% Diplomas Granted	Regular	12	90.6	68.7	75.8	81.8
	Honors	12	49.6	26.7	20.0	8.5
	Special Education	12	1.8	1.4	1.5	1.9
	Certificate of Attendance	12				0.9
	Seniors not Receiving Diploma in Spring Graduation	12	2.7	3.2	2.7	6.9
% Students in Vocational Education Courses		7-12	33.0	40.9	41.0	45.5
% Students in Special Education		K-12	12.1	11.3	12.1	14.2
% Chapter 1 Students		K-12	13.3	15.5	12.4	11.9

Figure 2. General information found on a typical school district's report card.

(2) Professional Educator Information, and (3) Student information.

The Testing information is organized under four headings which include grade level, the prior school year (1987-88), the present school year (1988-89), and state average. The School System information is organized under five headings which include grade level, two years prior data (1986-87), one year prior (1987-88), present year (1988-89), and state average. In TN, each school district's report card defined all categories. The three sets of testing information reported are divided and described as follows:

a **Basic Skills First Achievement Test (BSF)** *The BSF is administered to students in grades 3, 6, and 8. This test measures how well students have mastered essential reading and mathematics skills. These scores show the average percent of skills mastered by students in your school system.* This study used the 1989, 8th-grade data.

b. **Stanford Test of Academic Skills (TASK 2) (STAT)** *The STAT is administered to students in grades 2, 5, 7, 9, and 12. These tests show how students perform when compared to students at the same*

grade nationwide. These scores are reported as stanines. Stanines are scores from one to nine, where one is low and nine is high. An average score is four, five, or six. These scores show the average stanine on each part of the test for the students in your school system. This study used the 1989, 12th-grade data.

c. **Tennessee Proficiency Test (TPT)** *The TPT measures minimum skills in mathematics and language arts. Students must achieve a passing score of 70 percent correct on both the math and language arts tests in order to fulfill one of the requirements for receiving a regular diploma. Students take the test for the first time in the ninth grade.* This study used the 1989, 9th-grade data.

Seven of the eight categories of report card information used for this study are defined by report card developers as follows (*Average Daily Membership* was not specifically defined):

a. **County per Capita Income (CCI)** *This figure represents the per capita personal income for the county in which your school system is located. The most recent figures available from the U.S. Bureau of Economic Analysis are for 1987.*
b. **Average Professional Salary (APS)** *This figure shows the* ***estimated*** *average salary for all certificated personnel in your school system.*
c. **Expenditures per Pupil (EPP)** *This figure shows the average number of dollars spent for each pupil in average daily attendance for your school system.*
d. **Average Daily Membership (ADM)** (*The Report Card did not provide a definition for this category*).
e. **Percent of Students in Attendance (%SA)** *This figure shows the average percent of students in attendance daily in the individual school districts for the school years 1986-87, 1987-88, 1988-89.*
f. **Percent of Oversized Classes (%OC)** *This figure shows the percent of classes in all grade levels which had waivers for being over the maximum class size. Maximum class sizes in Tennessee are: 25 for grades K-3, 28 for grade 4, 30 for grades 5-6, 35 for grades 7-12, and 23 for vocational.*
g. **Percent of Students on Free or Reduced Lunches (%FRL)** *Students whose family income meets certain criteria are eligible for free or reduced price lunches. This figure shows the percent of students in your school system who receive free or reduced price lunches.*
h. **Percent Professionals on Career Ladder Levels II and III (%CL)** *This figure shows the percent of professional staff in your school system who have met the standards for Career Levels II and III. These are the upper rungs of Tennessee's Career Ladder program. The number includes regular classroom teachers, guidance counselors, librarians and administrators.*

The investigators chose the above categories (*including ADM*) in addition to test results for detailed study. These eight categories were chosen because many educators and lay persons believe that they have great impact on student academic performance, and they were reported on the cards.

III. METHODOLOGY

Investigators used the 1988-89 report cards as the basis for the study. Although the report cards provided test results at several grade levels, only the average scores for the highest grade levels reported were used in these analyses. Those scores were considered as best representing the final product of the school system. Five research questions guided the study:

1. How do school district characteristics currently reported in the report cards relate to reported student academic achievement?
2. How do reported school district characteristics relate to each other?
3. When rank ordered on the basis of student outcomes, how do school districts within the state perform in terms of the district and community characteristics reported in the report card?

4. Do the reported school district characteristics appear to represent all factors which influence student academic achievement?
5. How might the findings of this study inform educational policy at state and local levels?

Investigators treated student outcome data (test data) as the dependent variable and other characteristics reported as independent variables which influence student outcomes. Several types of analyses of the available data were conducted.

First, profiles of all school districts in the state were produced, as well as profiles of the 121 school districts constituting the final sample. These profiles provided a statewide picture and helped researchers to determine if the study sample varied in any significant way from the state composite.

To develop a response to research question #1, three analyses were conducted. First, a linear regression model was used to assess the relationship between each reported characteristic and the school district's mean student outcome (MSO). Since three different sets of test scores were reported, it was necessary to combine them to create a mean student outcome measure for each school district. To create the MSO, the mean scores reported for each test were first converted to z-scores. The z-scores were then used to compute the MSO. Only school districts reporting scores for all three tests (8th grade BSF; 12th grade STAT; and 9th grade TPT) could be used. Therefore, only 121 of TN's 139 school districts were in the final sample. A Pearson Product Moment correlation was developed as a means of comparing categories.

The second analysis for the first research question used two procedures. First, report card information was reorganized into three clusters: testing, money, and school system information. That structure is outlined below:

1. Testing information
   - Basic Skills First Achievement Test (BSF)
   - Stanford Test of Academic Skills (Task 2) (STAT)
   - Tennessee Proficiency Test (TPT)
2. Money Information
   - County per Capita Income (CCI)
   - Average Professional Salary (APS)
   - Expenditure per Pupil (EPP)
3. School System Information
   - Average Daily Membership (ADM)
   - Percent of Student in Attendance (%SA)
   - Percent of Oversized Class (%OC)
   - Percent of Student on Free or Reduced Lunches (%FRL)
   - Percent Professionals on Career Ladder Levels II and III (%CL)

The purpose of this clustering was to facilitate investigation of the interactions of multiple, related categories with student outcomes and with each other. All data for categories clustered as "Money" or "School System" were converted to z-scores, then the Pearson Product Moment correlation was applied.

The third analysis employed Guttman's partial correlation procedure. Once partial correlations were developed for each category, they could be converted to percentages of influence, thereby enabling

investigators to determine the relationship of each independent variable (category) to the dependent variable (mean student outcome).

To answer research question #2, investigators computed correlations among independent variables (categories in the Money and School System clusters). A *coefficient of determination* (r^2) was used to determine the levels of interaction between categories within a cluster and across clusters.

Research question #3 required the rank ordering of school districts within the sample by mean student outcome. After completing the rank ordering, investigators focused attention on the nine school districts exhibiting the highest MSOs and the nine demonstrating the lowest MSOs.

Research question #4 required no further statistical analyses. The partial correlation coefficients and related percentages of influence developed in response to research question #1 provided the necessary data.

Research question #5 was created as a means of focusing conclusions and implications of the study. The development of report cards on schools and the demographic data reported in them reflect unstated assumptions about their relationship to a great extent. If the findings of this study have any value, it may well be the informing of policymakers and policy.

IV. FINDINGS

Findings of the study are reported in two areas: descriptive analyses of school districts and responses to the research questions.

A. Descriptive Analyses of School Districts

1. The 1988-89 Profile of TN's 139 School Districts

A profile of TN school districts (n=139) by Report Card category was developed (see Table 1.). For each category, mean score, standard deviation, number of schools submitting data and range of scores or numbers were compiled.

a. Outcome Data

Of the 139 TN school districts, 96% reported BSF scores, 89% reported TPT scores, and 87% reported STAT scores. An average of 81% of all students taking the 8th grade BSF in 1988-89 passed the Reading sub-test, and 66% passed the mathematics component. Just over 76% of all students completing the TPT passed both the mathematics and language components. More students passed the mathematics sub-test (90%) than the Language component (76%), a reversal of the results on the BSF, usually given a year earlier. In 1988-89, the mean scores of 12th grade students taking the STAT was near the 5th stanine (4.8-5.3) on all five sub-tests. Scores on all three tests ranged from several standard deviations below to several above the mean.

Table 1. A "Report Card" Profile of Tennessee's 139 School Districts in 1988-89.

139 SCHOOL DISTRICTS

	SD	n	Report Card Max	Min.	Mean
OUTCOMES					
Basic Skills First Achievement Test			(Percent passing): 8th grade		
Reading	4.9	134	93	65	81
Math	7.6	134	85	43	66
Stanford Test of Academic Skills; Task 2			(Stanine score): 12th grade		
Reading	.5	121	7	4	5
Math	.5	121	6	4	5
English	.6	121	7	4	5
Science	.5	121	6	3	5
Social Studies	.5	121	6	4	5
Tennessee Proficiency Test			(% Students passing): 9th grade		
Language	7.1	124	98	56	76
Math	6.4	124	100	59	90
Both	9.4	124	98	48	76
MONEY					
Co./Capita Income ($)	2,030	139	19,318	6,934	12,878
Student Expenditure ($)	505	139	4,891	2,163	3,304
Aver. Prof. Salary ($)	2,683	139	34,796	21,015	26,756
SCHOOL SYSTEM					
Average Daily Mem. (#)	11,702	139	104,788	188	5,874
Student Attendance (%)	1.3	139	97.1	90.3	93.6
Oversized Class (%)	4.6	122	21.5	0.1	3.8
Free/Reduced Lunch (%)	4.3	139	86.0	9.0	42.5
Career Ladder II/III (%)	6.1	138	41.5	4.1	14.8

b. Money Matters

In the **Student Expenditure Per Year** category, students in the richest school district were supported by $4,891 per year and the students in the poorest district by $2,163 per year, a $2,728 per year difference between the richest and poorest districts . The mean **County per Capita Income** was $12,878, with a range from $19,318 to $6,934 (*an approximate 300% difference*). The **Average Professional Salary** mean was $26,756, with a range from $34,796 to $21,015.

c. School System characteristics

All TN districts provided **Average Daily Membership** (ADM) category data. The average school districts' daily attendance was 5,874 students. The largest district had 104,778 students and the smallest district had

188 students. The percent of **Student Attendance** (%SA) for the top school district in this category was two SDs above the mean and for the bottom school district, two SDs below the mean. The top district had 97% attendance and the lowest district had 90% attendance—a 7% difference. Percent of **oversized classes** (%OC) was reported by 122 school districts. State class size restrictions in 1988-89 were 25 students in grades K-3, 28 students in grade 4, 30 students in grades 5-6, 35 students in grades 7-12, and 23 students in vocational classes. An oversized class was any class exceeding these numbers. The percentage of oversized classes reported ranged from 0.1% to 21.5%.

Students participating in the **Free or Reduced Lunch** (%FRL) program in 1988-89 ranged from a low of 9% to a high of 86%. This category is one common (but usually understated) indicator of the socio-economic status (SES) level of families served by the school.

Tennessee has one of the few operational career ladder programs for professional educators (teachers, administrators, other) in the country. Since 1984, professional educators have been able to apply for evaluation for levels I, II, and III on the Career Ladder and receive merit pay as well as extended contract opportunities, if they achieve the upper rungs (Levels II, III). In 1988-89, approximately 15% of all professional educators had achieved **Career Levels II and III** (%CL) as indicated in the report cards. Percentages of educators at these levels in individual school districts ranged from 4% to 42%.

2. Descriptive Analysis of 121 TN School Districts Reporting Necessary Student Outcome Data

Student outcomes were a major focus of this study, so school districts that did not report all three sets of test scores were excluded from further investigation. Of 139 school districts, 121 provided the necessary student test data. The profile for these 121 school districts did not vary greatly from that of the total 139 districts (see Table 2.). Means for the outcomes measure remained constant. Mean County/district per capita income dropped 75 dollars. Average per pupil expenditure rose 19 dollars. Average professional salary fell 84 dollars. Average Membership rose 689 students. The percentage of oversized classes dropped 0.4%. Percentage of students in the free or reduced lunch program rose 0.5 percent, and percentage of career Level II and III teachers dropped 0.2 percent.

B. Findings Pertinent to Research Questions (*All correlations appear in the correlation matrix, Figure 13, p. 18*)

1. How do school district characteristics currently reported in the report cards relate to reported student achievement?

A linear regression model was used to assess the relationship between each reported characteristic and the school district's mean student outcome (MSO). In addition, by using the state mean and MSO, outlier school districts were identified. Below are the results of this analysis reported by characteristic.

Table 2. A Report Card Profile of 121 Tennessee School Districts sampled.

121 SCHOOL DISTRICTS

	M	SD	n	Max	Min.	Report Card Mean
OUTCOMES						
Basic Skills First Achievement Test				(Percent passing): 8th grade		
Reading	82.3	4.9	121	91	65	81
Math	67.6	7.7	121	85	43	66
Stanford Test of Academic Skills; Task 2				(Stanine score): 12th grade		
Reading	5.2	0.5	121	7	4	5
Math	5.2	0.5	121	6	4	5
English	5.3	0.6	121	7	4	5
Science	4.8	0.5	121	6	3	5
Social Studies	4.8	0.5	121	6	4	5
Tennessee Proficiency Test				(% Students Passing): 9th grade		
Language	78.7	8.6	121	98	56	76
Math	90.5	6.4	121	98	59	90
Both	77.2	9.3	121	98	48	76
MONEY						
Co./Capita Income ($)	10,860	1,962	121	19,318	6,934	12,878
Stud. Expenditure ($)	3,038	509	121	4,891	2,318	3,304
Aver. Prof. Salary ($)	24,935	2,693	121	34,797	21,286	26,756
SCHOOL SYSTEM						
Average Daily Mem.(#)	6,564	12,395	121	104,788	375	5,87 4
Student Attendance (%)	93.5	1.3	121	97.1	90.3	93.6
Oversized Class (%)	5.8	4.1	110	21.5	0.1	3.8
Free/Reduced Lunch (%)	39.7	14.5	121	86.0	9.0	42.0
Career Ladder II/III (%)	14.9	5.9	121	41.5	4.1	14.8

a. Influence of County Per Capita Income (CCI)

As indicated in Figure 3, there is a positive correlation between MSO and CCI. The regression line intercepts the MSO zero z-score mean at $11,000, a point $1,800 below the state average per capita income of $12,878. Generally, school districts with greater per capita incomes demonstrated higher student test scores (r=.31). However, it should be noted that most (i.e., ≈9:1 ratio) school districts' per capita income falls below the reported state mean ($12,878).

Even while a positive relationship between per capita income and test results was demonstrated, there were "outlier" districts; i.e., districts that did not follow the trend. Four districts had per capita incomes at least

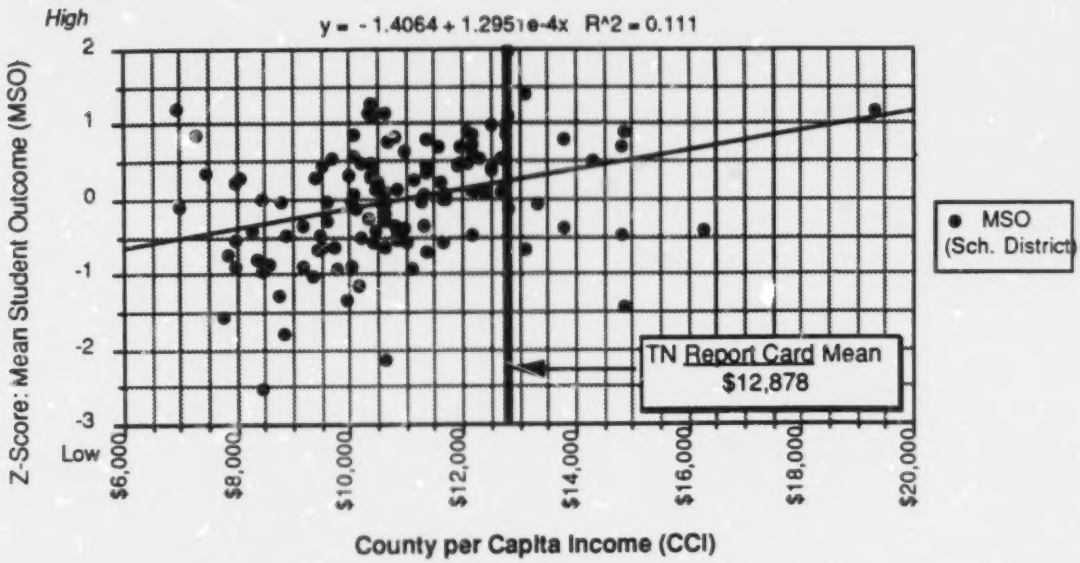

Figure 3. Relation of Per Capita Income to Mean Student Outcome.

$2,000 below the state mean, but had mean student outcomes at least one standard deviation above the mean. One of these districts had a per capita income almost $6,000 below that mean.

b. Influence of Average Professional Salary (APS)

There was a significant positive correlation between size of professional salary and student achievement (r=.44) — the highest positive correlation for the three money categories. The mean professional salary for the state in 1988-89 was $26,756, but the salary ranged from a low of $21,000 to a high of $35,000 (see Figure 4). Most school districts (=4:1 ratio) have a smaller APS than the state mean of $26,756.

Generally, school districts with higher mean professional salaries demonstrated higher MSO's. However, this category also displayed "outlier" school districts. One of the nine districts with the highest mean student outcomes in the state had a professional salary average of less than $22,000, another's MSO was $24,000, and two others had means under $25,000. Of the nine districts with the lowest MSO z-score, all but one were below the APS state average.

c. Influence of Expenditure Per Pupil (EPP).

The majority of TN school districts did not expend the state mean EPP of $3,306 (=4:1 ratio). The trend line in Figure 5 shows a small positive correlation between student outcomes and money spent per student (r=.22). The EPP correlation was the smallest of the three money category correlations.

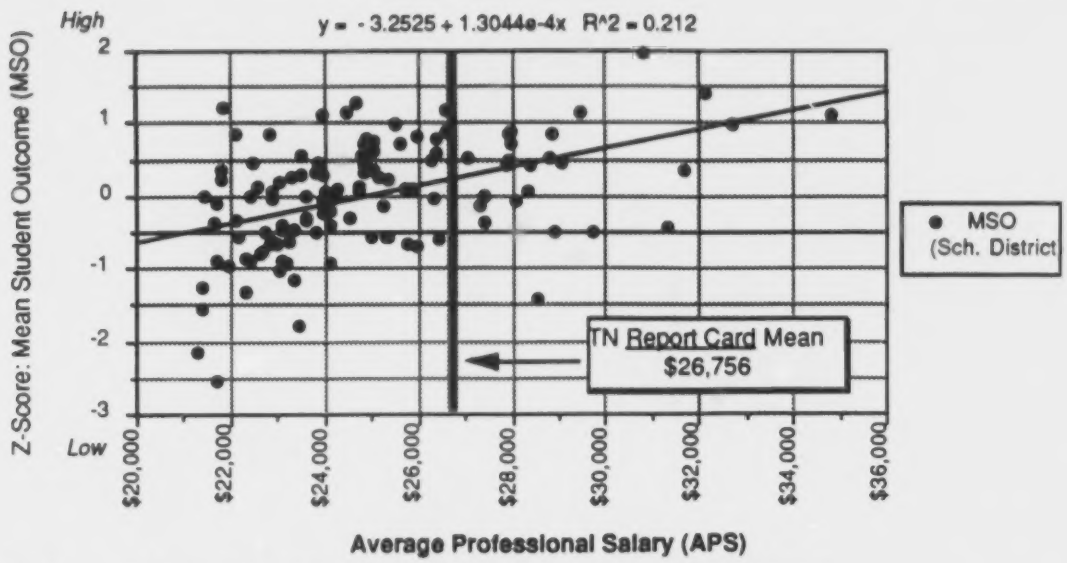

Figure 4. Relation of Average Professional Salary to Mean Student Outcome.

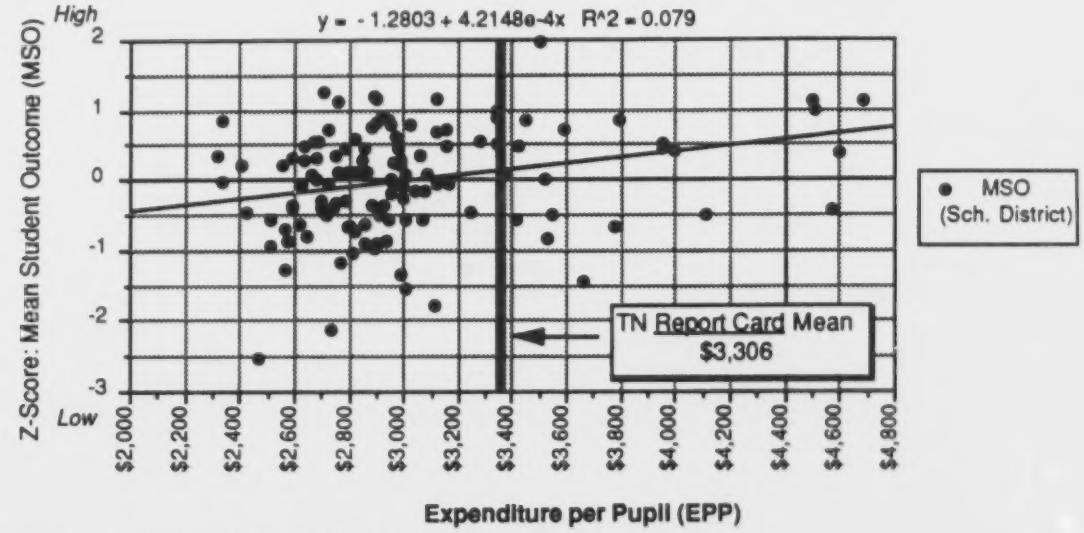

Figure 5. Relation of Expenditure Per Pupil to Mean Student Outcome.

While districts with higher expenditure per student tended to have slightly higher student outcomes than their fellow districts, six of ten school districts with MSOs at or exceeding one standard deviation above the mean were below the state mean in money spent per student. Two of those districts spent at least $500 less than the mean, and four of them spent at least $400 less. For every TN school district above the mean EPP, four were below the 1988-89 report cards' EPP mean.

d. Influence of Average Daily Memberships (ADM).

There was no significant correlation between size of school district (as measured by ADM) and student outcomes. The slight correlation which did exist was negative (r= -.09), meaning that larger size tended to influence student performance negatively.

The state mean ADM of 5,874 students per district was obviously influenced by a few large school districts, since most districts clustered below that mean (three districts below for every one above--see Figure 6). In actuality, 83% of TN school districts reported fewer than 15,000 students. Only 10 school districts had enrollments above that figure, and two districts had very large enrollments when compared to the rest.

e. Influence of Student Attendance (%SA)

A significant, positive correlation (r=.41) existed between student attendance and student achievement (MSO). Generally, where average daily membership was greater, achievement was higher.

As portrayed in Figure 7, state average attendance in 1988-89 was 93.6%. Most school districts exceeded this average by a ratio of ≈ 7 to 4. All districts whose attendance averaged 92% or less demonstrated MSO z-scores at or below zero; 6 of 8 districts where average attendance exceeded 96% had positive MSO z-scores.

f. Influence of Oversized Class (%OC)

Of the 121 school districts studied, 110 reported oversized class data. There was a significant, negative correlation between the percentage of oversized classes in a district and mean student outcome (r=-.30). Generally, districts with larger numbers of oversized classes had lower mean student outcomes and vice versa. [1]

Among the 110 school districts reporting oversized classes, the average percentage of classes exceeding regulations was 3.8 (see Figure 8). Of the nine school districts with MSO z-score of negative one SD or below, seven exceeded the average percentage of oversized classes. Of the 9 school districts with an MSO z-score of plus one or above, only 3 exceeded the state average of 3.8%. No fewer than 37 districts that reported more than the state mean of oversized classes demonstrated mean student outcomes at or above the state mean. Fifteen districts reporting a percentage of oversized classes below the state mean also had MSO z-scores below zero. The impact of class size cannot be simply interpreted.

g. Influence of Free or Reduced Lunch as Socio-Economic Status Indicator (%FRL)

The percentage of free and reduced lunches (FRL) was one indicator of socio-economic status (SES) of the

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1 This is an interesting finding considering the results of Tennessee's massive, four-year longitudinal/class-size study, Project STAR, which showed convincingly the benefits to student achievement of reduced class size (to 1:15) in primary grades (Finn & Achilles, 1989; Word, et. al., 1989). STAR, however, assessed grades K-3; this analysis reviewed later grades.

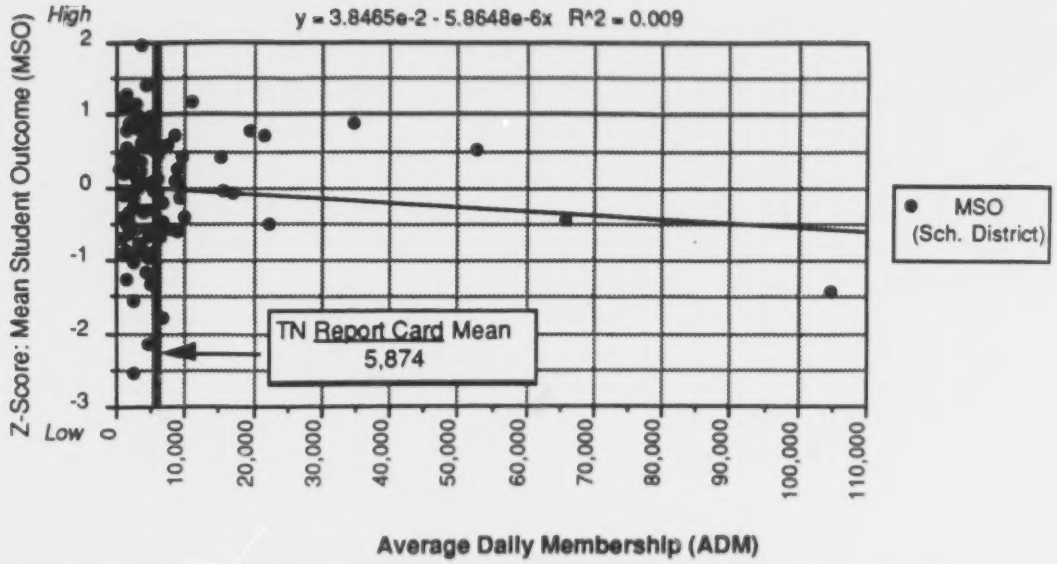

Figure 6. Relation of Size of School District (Average Daily Membership) to Mean Student Outcome.

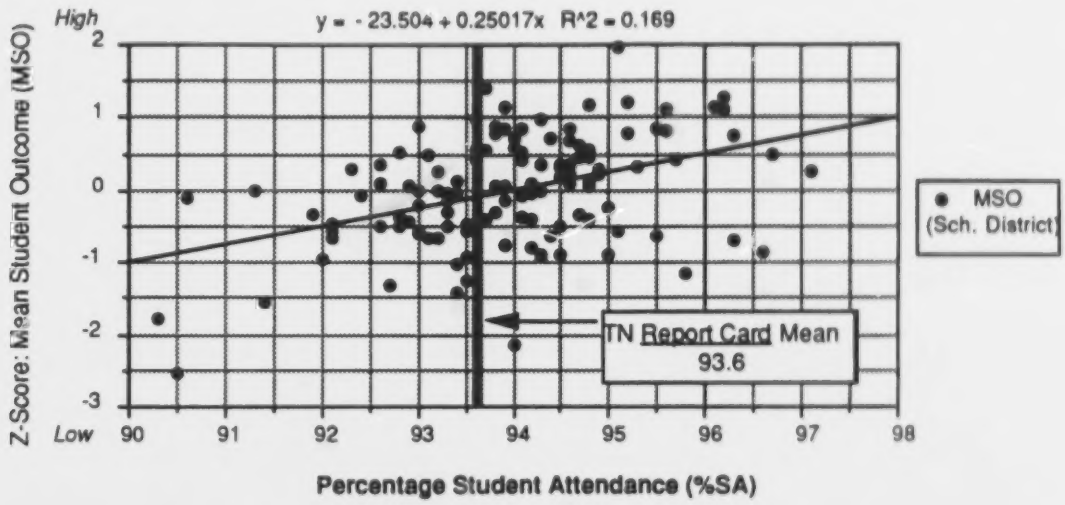

Figure 7. Relation of Percentage of Student Attendance to Mean Student Outcome.

community; the higher the percentage of free and reduced lunches, the lower the SES of the community. As Figure 9 indicates, there was a significant negative correlation between %FRL and mean student outcome (r=-.49). School districts with lower percentages of free and reduced lunches generally had higher MSO z-scores.

The average %FRL statewide was 42%. However, two-thirds of all school districts reported percentages of FRL below the state average. Seven of the nine districts with MSO z-scores of negative one SD or below had larger %FRL than the state average, and five of the six school districts with the highest percentages of free and

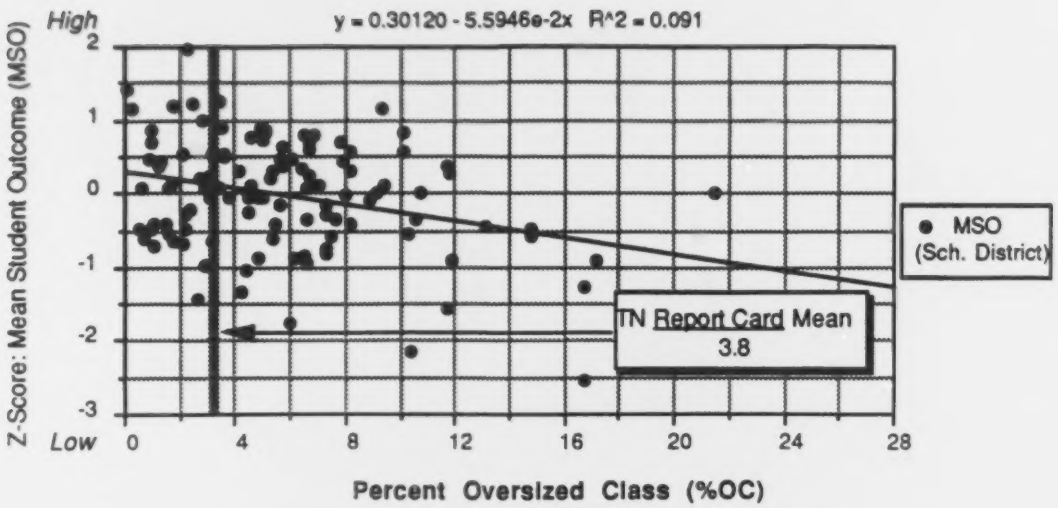

Figure 8. Relation of Percent Oversized Class to Mean Student Outcome.

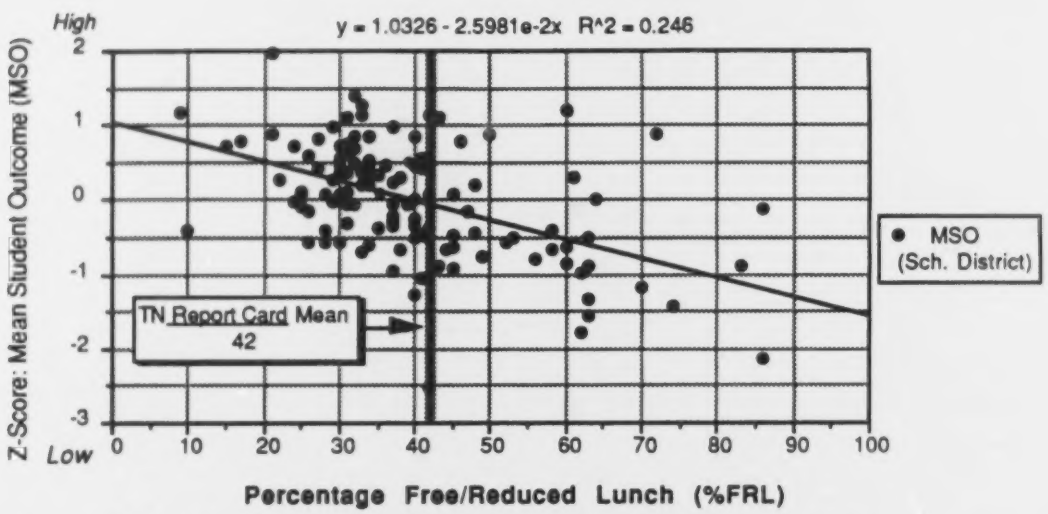

Figure 9. Relation of Percentage Free or Reduced Lunch to Mean Student Outcome.

reduced lunches demonstrated negative MSO z-scores. Alternatively, seven of the nine districts with MSO z-scores of plus one or higher had lower than state average percentages of free and reduced lunches. However, in this category, as in others, there were"outlier" districts. Two of the nine districts with MSO z-scores above plus one were above the state average for %FRL. One of those districts had 60% of its students on free and reduced lunches.

h. Influence of Percentage of Career Ladder (%CL) Teachers

Since TN's Career Ladder program is intended to identify and reward outstanding teachers, it could be assumed that a high percentage of Career Ladder II & III teachers in a school district indicated good instruction in that district. However, the reverse could not be assumed. Low percentages of Career Ladder II & III teachers did not necessarily suggest poor instruction, because the Career Ladder program is optional. Teachers can choose to be evaluated for Career Ladder status.

There was a significant but modest positive correlation between percentage of Career Ladder teachers in a district and student outcomes (r=.31). The trend line in Figure 10 suggests that the greater the number of Career Ladder teachers, the higher the MSO. The four school districts with the lowest MSO z-scores also had low percentages of Career Ladder teachers.

The average percentage of upper-level Career Ladder teachers statewide was 14.8%, and slightly more districts reported percentages below that average than above (a 7:5 ratio). While seven of the ten districts generating the highest MSO z-scores reported more upper-level Career Ladder teachers than the state average, there were also "outlier" districts in this category. The district with the highest percentage of upper-level Career Ladder teachers had a mean student outcome well below the state mean. Greater numbers of upper-level Career Ladder teachers were not a guarantee of better student performance. Note also that Career Ladder status is not independent of years of teaching experience.

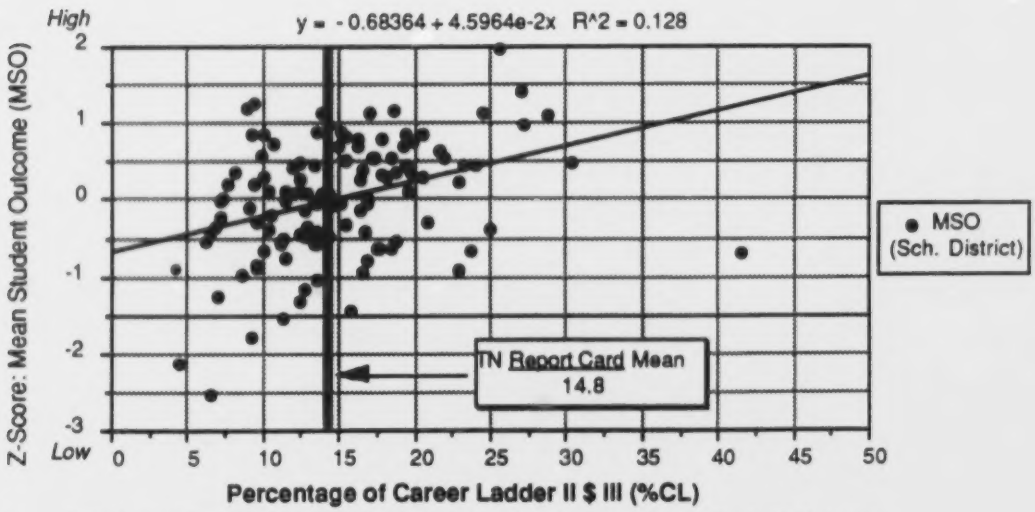

Figure 10. Relation of Percentage of Career Ladder Teachers to Mean Student Outcome.

I. **Relationships of the Money, and School System Clusters to mean Student achievement (Mean Student Outcome [MSO]).**

The three Money characteristics (per capita income, per pupil expenditure, and average professional salary) when combined, produced a significant positive correlation (r=.41) with MSO (see Figure 11). This finding is not surprising since each characteristic individually provided a positive correlation.

However, four school districts with money z-scores below zero produced mean student outcomes at least one SD above the state mean, and one school system with a money z-score one and one-half SDs above the mean produced a mean student outcome one and one-half standard deviations below the mean.

Data in Figure 12 show that the five school system factors (*percent student attendance, percentage of free or reduced lunches, percentage of oversized classes, percentage of Career Ladder teachers and average daily membership*), when combined, produced a moderately high, significant positive correlation (r=.50) with MSO. Based on the sizes of the correlation coefficients, one could say that these school system characteristics relate to student outcomes more than do the reported money factors. While fiscal resources are important to student achievement, this finding suggests that other factors within a school district may be equally or more important.

Of the eight factors (see Figure 13) studied for their relationships to MSO, five demonstrated significant ($p \leq .01$) positive correlations:

1. Average Professional Salary (r=**.44**)
2. Student Attendance (r=**.41**)
3. County Per Capita income (r=**.31**)
4. Number (percentage) of Career Ladder Teachers II & III (r=**.31**)
5. Expenditure Per Student (r=**.22**)

Two factors yielded significant negative correlation with student outcomes:

1. Number (percent) of Free or Reduced Lunches (r= **-.49**)
2. Number (percent) of Oversized Classes (r= **-.30**)

One factor did not show either a significant positive or significant negative correlation with MSO: Size of School District (Average Daily Membership).

However, these correlations do not fully answer research question #1. To refine the response, Guttman's partial correlation procedure was used (i.e., The ***Kaiser*** was run and the total matrix sampling adequacy was greater than .500 so that Guttman's assumptions were met). The resulting matrix is shown in Figure 14.

Once these partial correlation coefficients were developed, they were converted to percentage of influence (PI) as displayed in Table 3. Several trends emerge from this analysis. First, the eight factors investigated account for only 26.5% of whatever relates to MSO, a fact discussed in more detail in response to research question #4.

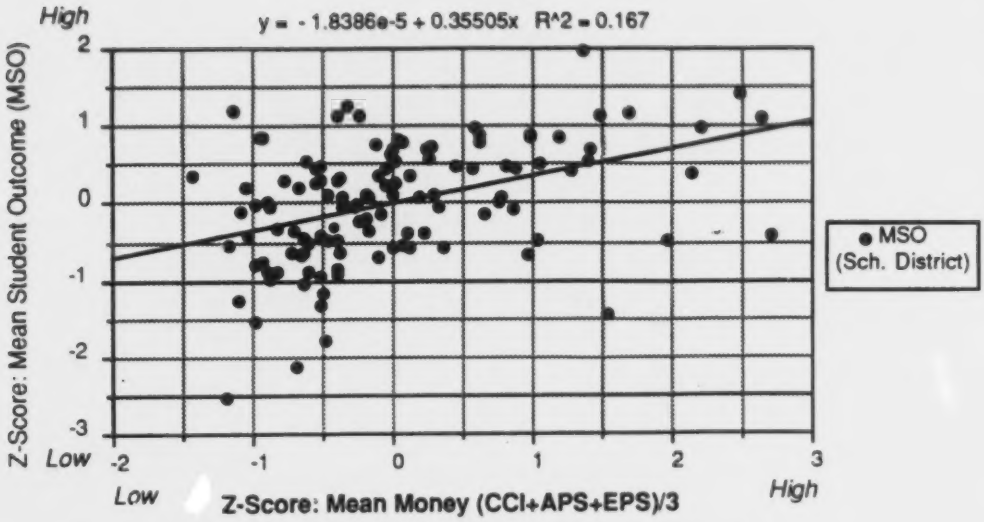

Figure 11. Relation of Combined Money Factors to Mean Student Outcome.

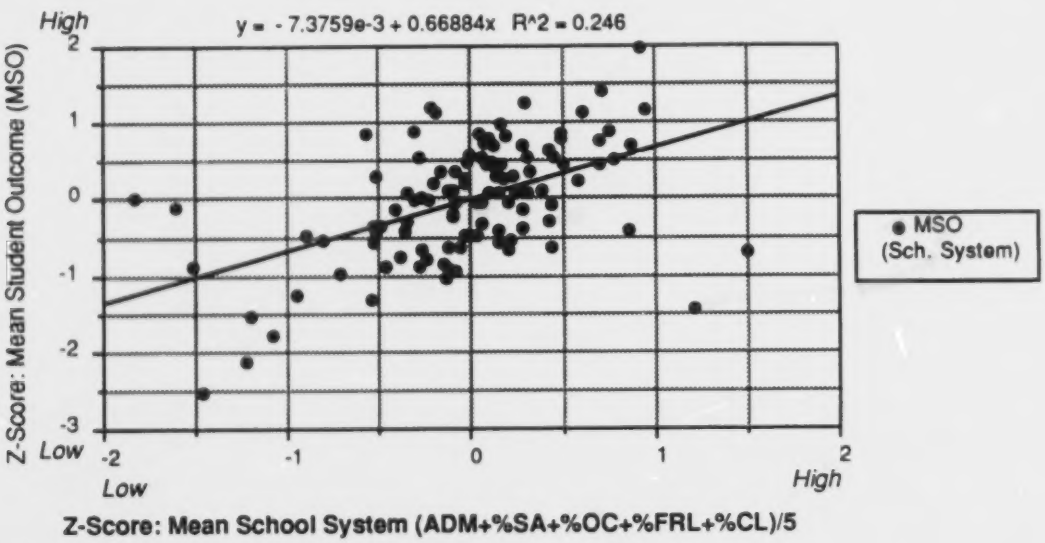

Figure 12. Relation of School System Factors to Mean Student Outcome.

Equally interesting is the distribution of variability among the factors. Of the approximate 25% influence on MSO exerted by the combined money and school system variables, almost 11% was provided by student attendance. A student's learning and achievement are influenced by his/her presence in school (*time on task*). Six percent of the association with MSO was produced by socio-economic status of the community (*%FRL*); 5.6% was attributable to APS. Percent oversized classes accounted for only six-tenths of one percent of the student achievement results; affluence of the community *(CCI)* contributed only 4-tenths of one percent of the

	Outcome				Money			School System			
	BSF	STAT	TPT	MSO	CCI	APS	EPP	ADM	%SA	%OC	%FRL
BSF	1										
STAT	**.358**	1									
TPT	**.387**	**.438**	1								
MSO	**.753**	**.770**	**.793**	1							
CCI	*.140*	**.368**	*.219*	***.313***	1						
APS	*.214*	**.528**	**.272**	**.436**	**.706**	1					
EPP	*.081*	**.354**	*.087*	*.223*	**.437**	**.783**	1				
ADM	*-.146*	*-.0004*	*-.061*	*-.090*	**.529**	**.410**	**.330**	1			
%SA	**.403**	*.117*	**.418**	**.407**	*.063*	*.042*	*-.138*	*-.155*	1		
%OC	**-.235**	**-.294**	*-.174*	**-.302**	**-.356**	**-.458**	**-.390**	*-.198*	*-.203*	1	
%FRL	**-.347**	**-.422**	**-.362**	**-.488**	**-.533**	**-.372**	*-.003*	*.063*	**-.259**	*.191*	1
%CL	*.188*	**.317**	*.214*	**.310**	**.338**	**.468**	**.266**	*.025*	*.209*	**-.348**	**-.321**

p .01 = **Bold**

Figure 13. Correlation Matrix for testing, money, and school system categories (Pearson).

	Z: MSO	Z: CCI	Z: APS	Z: EPP	Z: ADM	Z: %SA	Z: %OC	Z: %FRL	Z: %CL
Z: MSO	***.444***								
Z: CCI	**-.061**	***.707***							
Z: APS	**.236**	.295	***.839***						
Z: EPP	**-.003**	-.007	.741	***.735***					
Z: ADM	**-.166**	.506	.211	-.151	***.493***				
Z: %SA	**.330**	.01	.005	-.188	-.057	***.266***			
Z: %OC	**.076**	.043	.033	.146	.071	.176	***.283***		
Z: %FRL.	**.244**	.499	.24	-.394	-.391	-.008	-.005	***.586***	
Z: %CL	**-.040**	.018	.299	-.127	-.166	.105	.163	.024	***.312***

Figure 14. Guttman's Partial Correlation matrix for MSO and the other Tennessee 1989 Report Card categories.

influence, and %CL contributed only two-tenths of one percent. The EPP alone showed **NO** association with MSO. Implications of these findings are discussed in response to research question #5.

2. How Do Reported School District Characteristics Interact with Each Other?

To determine the interaction of money and school system factors, they were correlated with each other. As demonstrated in Figure 13, significant ($p \leq .01$) correlations resulted for 14 of 18 combinations.

Average Professional Salary (APS) correlated significantly and positively with EPP (r=.78), CCI (r=.71), %CL (r=.47), and size of school district (r=.41). Expenditure Per Pupil (EPP) correlated significantly and positively with ADM (r=.33) and %CL (r=.27). None of these relationships is unexpected.

Table 3. Partial correlations and percentage of influence (PI) of each category on mean student outcome.

	r	r^2	PI (%)
Money			
County per Capita Income (CCI)	-.061	.004	0.4
Average Profession Salary (APS)	.236	.056	5.6
Expenditure per Pupil (EPP)	-.003	.00	0.0
School System			
Average Daily Membership (ADM)	-.166	.028	2.8
Percent Student Attendance (%SA)	.330	.109	10.9
Percent Oversized Class (%OC)	.076	.006	0.6
Percent Free/Reduced Lunch (%FRL)	.244	.060	6.0
Percent Career Ladder II & III (%CL)	-.040	.002	0.2
TOTAL	—	---	**26.5%**

Significant, negative correlations occurred between the following factors:

a. CCI *and* %FRL (r= **-.53**)
b. APS *and* %OC (r= **-.46**)
c. EPP *and* %OC (r= **-.39**)
d. APS *and* %FRL (r= **-.37**)
e. CCI *and* %OC (r= **-.36**)
f. %OC *and* %CL (r= **-.35**)
g. %FRL *and* %CL (r= **-.32**)
h. ADM *and* %FRL (r= **-.26**)

Most of these negative correlations are not surprising. Since oversized classes and low socio-economic status of the community as portrayed in high percentages of free and reduced lunches are generally perceived to have negative impact on educational outcomes, the correlations reported reinforce these perceptions and show the extent of their impact on other aspects of the educational enterprise. Several relationships demonstrated in the negative correlations reflect "common sense." It seems reasonable that lower per capita income, higher percentage of free and reduced lunches, and larger class sizes go hand-in-hand. Lower per pupil expenditures usually are associated with larger class sizes. Professional salaries are often lower in communities with fewer financial resources—communities where class sizes and numbers of free and reduced lunches will be larger. Nor is it surprising that greater percentages of upper-level Career Ladder teachers are found in communities with more money and lower class sizes.

3. **When rank ordered on the basis of student outcomes, do school districts within the state perform as expected in terms of the money and school system characteristics reported in the Report Cards?**

One might expect that school districts with money, better teacher salaries, enrollments which are not extreme (very large, very small), fewer oversize classes, higher attendance and high percent of upper-level Career Ladder teachers would produce the best MSO. In general, those expectations were confirmed in the regression analyses conducted in response to research question one. There are, however, outlier districts producing MSO significantly lower or higher than could be expected. Figures 11 and 12 pinpoint these exceptions. Tables 4 and 5 highlight these exceptions.

In Table 4, the nine highest and nine lowest ranked districts by MSO are profiled by their z-scores on the eight independent variables. The district producing the fourth highest MSO does not conform to expectations in at least four of eight areas. It has low CCI and APS, a high %FRL and a small %CL. It does not rate as high as other districts in the "top nine" category in several other areas. It would not be expected to be a "top 9" MSO school district, but it is.

The school district ranked number 117, fifth from the bottom in MSO in the sample of 121 school districts is also an "outlier." It has the second highest CCI z-score (2.04) for the 121 school districts, high APS, and large EPP as demonstrated by rank and z-scores. It is, however, a large school district as demonstrated by its z-score in that category (7.92).

Table 5 data are also useful in responding to research question #3. The nine highest performing school districts (MSO) and the nine lowest performing districts were profiled among all school districts studied on the eight independent variables.

The positional profile reveals that the third, fourth, sixth, and eighth highest performing school districts do not conform to commonly held beliefs about school district performance (e.g., a direct, positive correlation between MSO and school system data). District #3 places 73rd in CCI among 121 districts and 94th in EPP. It is a small (*104th ranking*), rural school district with relatively few Career Ladder teachers (*103rd ranking*). However, it has proportionately high ADM (*tied for 6th position*) among 121 districts.

School district #4 has the lowest per capita income among districts in the sample (*121st ranking*). It is 110th in per pupil expenditure and 66th in professional salary. It is also a small, rural school district *(118th ranking)* with many students on free or reduced lunches (*106th position*) and few Career Ladder teachers (*107th position*). However, it is tied for 16th place in attendance rate and only 26th in oversized classes, a statistic which indicates fewer oversized classes than roughly four-fifths of the districts studied.

The school district with the 6th highest MSO consistently placed in the lower half of the districts in the sample in all factors except %CL teachers where it ranked at the bottom of the upper quartile.

The eight highest performing school districts demonstrated a profile similar to district #4, except that its attendance was better (*6th position*), and it had a higher %CL (*8th position*).

Table 4. Profile of Nine Highest and Nine Lowest Ranked (Rk) school districts by MSO z-score, TN: 1988-89 data.

	MONEY				SCHOOL SYSTEM			
RANK *n=*	Rk CCI *121*	Rk APS *121*	Rk EPP *121*	Rk ADM *121*	Rk %SA *121*	Rk %OC *110*	Rk %FRL *121*	Rk %CL *121*
Top 9								
1	14	6	18	**64**	18.5	24	5.5	6
2	12	3	1	50	**73**	1	39	5
3.	**73**	59	**94**	**104**	6.5	36	44.5	**103**
4	**121**	**110**	**66**	**118**	16.5	26	**106**	**107**
5	1	27	33	11	26.5	18	1	27
6	**77**	61	64	**74**	65	**92**	**84**	37
7	66	8	6	**78**	8	2	44.5	60
8	**73**	**71**	**85**	**119**	6.5	na	**87.5**	8
9	14	1	2	**108**	11.5	na	33	3
Bottom 9								
113	99	90	78	80	84.5	**44**	79.5	62
114	80	82	84	**51**	**9**	na	116	74.5
115	105	120	111	101	80.5	107	74	114
116	88	105	**48**	**44**	106	**43**	112.5	78.5
117	**3.5**	**13**	**13**	**1**	84.5	**27**	118	**48**
118	117	119	**42**	84	117	101	112.5	88.5
119	103	80	**34**	**23**	**121**	64	109	104
120	63	121	90	**45**	60.5	97	120.5	119
121	108	115	116	87	120	108	84	116

Underlined = a 60 ranking difference between the district's MSO rank and the individual category rank.

The MSO factor in all of these districts is relative. These top nine are the best performing school districts in the state, but the state averages typically do not place TN schools among the best performers in the country. It is clear, however, that money is not the most critical factor in MSO in TN's "high flyers." If any factors seem to be positively associated with student outcomes more than any others, they are size of school district, ADM and %OC. However, there are districts that do not have the highest ADM or lowest %OC that outperform the majority of districts in the state. Some other factors, not present in these report cards but associated with student achievement, are operating.

The analysis of the nine worst-performing districts confirms the findings on the other end of the spectrum. Some profiles among this group do not conform to commonly held beliefs or even to the patterns of the "outlier"

Table 5. Profile of Nine Highest and Nine Lowest Ranked School Districts by MSO z-score, TN; 1988-89 data.

	OUTCOME		MONEY		SCHOOL SYSTEM				
	MSO	**CCI**	**APS**	**EPP**	**ADM**	**%SA**	**%OC**	**%FRL**	**%CL**
n	*121*	*121*	*121*	*121*	*121*	*121*	*110*	*121*	*121*
					Top 9				
RANK									
1	1.97	**1.00**	**2.18**	0.91	-0.26	0.92	0.87	**1.30**	**1.81**
2	1.40	**1.44**	**2.67**	**3.64**	-0.18	-0.20	**1.39**	0.53	**2.06**
3	1.26	-0.24	-0.10	-0.66	-0.42	**1.79**	0.59	0.46	-0.90
4	1.20	-2.00	-1.14	-0.29	-0.47	0.99	0.81	-1.39	-1.01
5	1.17	**4.31**	0.61	0.16	0.36	0.68	0.98	2.11	0.64
6	1.50	-0.28	-0.17	-0.27	-0.30	-0.04	-0.86	-0.16	0.38
7	1.14	-0.13	**1.69**	**2.87**	-0.31	**1.71**	**1.34**	0.46	-0.16
8	1.12	-0.24	-0.37	-0.55	-0.47	**1.79**	na	-0.22	**1.62**
9	1.11	**1.00**	**3.66**	**3.24**	-0.43	**1.31**	na	0.60	**2.36**
M		0.51	1.00	1.00	-0.27	0.99	0.73	0.41	0.75
					Bottom 9				
113	-1.04	-0.78	-0.71	-0.45	-0.32	-0.42	0.34	-0.09	-0.21
114	-1.17	-0.35	-0.60	-0.54	-0.19	1.47	na	**-2.08**	-0.35
115	-1.29	**-1.07**	**-1.31**	-0.93	-0.40	-0.36	**-2.65**	-0.02	**-1.33**
116	-1.33	-0.47	-0.98	-0.10	-0.14	**-1.00**	0.39	**-1.60**	-0.40
117	-1.43	2.04	1.34	1.22	7.92	-0.44	0.78	**-2.36**	0.16
118	-1.55	**-1.59**	**-1.31**	-0.05	-0.34	**-2.04**	**-1.44**	**-1.60**	-0.60
119	-1.77	**-1.03**	-0.55	0.15	0.02	**-2.92**	-0.05	**-1.53**	-0.94
120	-2.14	-0.13	**-1.36**	-0.61	-0.14	0.01	**-1.12**	**-3.18**	**-1.75**
121	-2.53	**-1.23**	**-1.20**	**-1.12**	-0.34	**-2.76**	**-2.65**	-0.16	**-1.39**
M		-0.51	-0.74	-0.27	0.67	-0.94	-0.80	-1.40	-0.76

Bold = MSO z-score and category z-score ***are*** similar *(i.e., both are either positive or negative and are greater than one)*.

Underline = MSO z-score and category z-scores are ***not*** similar *(i.e., if one is a positive one or larger SD, the other item is a negative one SD)*.

schools with top performance rankings. The school district ranked 117th is a case in point. It ranks among the top districts in the state in all three money factors, in the top quartile (*small %OC*), and in the top half of the districts in the state in %CL. It has yet relatively low %FRL (*118th position*) and is fifth from the last in MSO. The factors that might contribute to low performance are the large size of the school district (*1st ranking*), low student attendance (ranks in the bottom third of districts) and low socio-economic status of the community (*118th in free/reduced lunches*). However, other districts with similar features (*except size*) did far better in student performance.

The findings in response to research question #3 present a mixed message. Not all districts performed as one could have expected.

4. Do the reported school district characteristics appear to represent all factors which relate to student academic achievement?

The answer to this question is clearly "no." The partial correlation and percentage of influence analyses reported in response to research question #2 (see Table 3) indicated that the eight factors studied as independent variables accounted for only one fourth of the influence on student outcomes. The ranking analysis conducted in response to research question #3 also suggested that in both the highest and lowest performing school districts, factors other than those reported in the report cards were at work. Almost three-fourths of whatever accounts for student academic performance is unknown based on these report cards--in contradiction to the "folk wisdom" of the day. What is the 3/4 and why haven't we discovered it yet?.

V. CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Investigators framed a fifth research question as a means of targeting conclusions and implications in a useful way:

5. How might the findings of this study inform educational policy and policymakers at the state and local levels?

Several points seem clear. "Good" inputs to the educational process (*money, small classes, good community*, etc.) do not guarantee high student achievement. If we want student achievement, we might study outputs (outcomes) not inputs and, following "effective school" methods, try to determine "correlates". Inputs commonly assumed to be associated with outputs account for only minor variation in performance outcomes (just over one-fourth). Further, the individual association of most of these factors (with the exception of attendance) is minor; debate over and attention to any one in isolation may be a wasteful activity. If we want to impact student performance, a comprehensive approach which addresses more critical factors is needed.

Policymakers need to consider these points carefully. In recent years, there have been attempts to compromise comprehensive educational reform packages by putting major emphasis and resources into one or two strongly lobbied dimensions of some comprehensive plan. While this approach may soothe feelings, it seems to do little to improve student achievement.

Another conclusion of the study: we are not yet talking about, dealing with and reporting many important influences on student outcomes. What are they? We need more research into the cause and effect relationship.

On the other hand, we may know more than we're measuring and reporting. It is currently popular to talk about restructuring schools, teaching and learning conditions and parent-school relationships. Some educators suggest and have some research to support the suggestion ("soft data") that student motivation and self-concept, student and educator attitudes, school climate, teaching strategies, administrator and teacher styles

and parent involvement in schools must change before much change will be seen in student academic achievement. Those factors can be rather easily measured and reported, as innovative schools such as those in the RJR Nabisco Foundation's Next Century Schools Project, the Coalition of Essential schools and other such endeavors are proving. How much influence do some of these other factors contribute to MSO? Modifications in school assessment requirements and report card inclusions could soon tell us.

There is also the problem of assessing what students know and are able to do. The investigators used available, reported test results in these analyses. Therefore, the findings are only as good as the test results. There is great debate about the value of present tests—both their content and format, and there is great demand for new and different assessments. If the test results used to form the dependent variable in this study (MSO) were not measuring the right things or were not measuring them validly and reliably, all other findings are of little value. We (the investigators) have no basis upon which to challenge any of the tests currently in use in Tennessee. The only statistical eccentricity noted as the various analyses were performed was the fact that correlations between the factors studied and student achievement were usually stronger when the single outcome measure of achievement was a nationally produced test: The Stanford Achievement Test, Task II, rather than a state-specific test —the Basic Skills or Proficiency test.

Finally, there is a note for those who are contemplating, creating or modifying report cards on schools. If the entries on those report cards are similar to those investigated in this study, they provide interesting statistics but only a small amount of information which can be of use in improving education. Further, whatever information is entered into the report card is of minimal use until additional analyses such as those conducted in this study are performed. Yet, since the commonly used and reported measures seem to account only for about a quarter of the variance relative to MSO, isn't it time to find out where the other three-fourths of the variance is lurking? Why do we bet so much on 25 percent?

Who is willing to break with tradition? Now is the time!

VII. INTERESTING QUESTIONS

If we insist on using report cards, or Department of Education "Wall Charts", here are some interesting questions:

1. Widget City (Figures 1 and 2) is the top MSO school district in TN for 1988-1989. Using this available information, can a building level/central office administrator, teacher, supervisor, parent, or a state department official make intelligent Outcome, Administrative, Financial,or Policy decisions?

2. What are some other identifiable, measurable indicators that might be added to a report card to evaluate student outcome?

VIII. A FOOTNOTE

There are other, more refined analyses of these data which can be conducted. For example, it is not entirely clear what effects outlier districts scoring very high or very low in any of the factors (outlier districts) have on statewide results and trends. These analyses are now in progress and will be reported subsequently.

IX. REFERENCES

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